IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:	WAYTE et al.	:	Confirmation No.: 1740
Application No.:	10/692,985	:	Group Art Unit: 1742
Filed:	October 24, 2003	:	Examiner: Jessee ROE

For: METHOD FOR FABRICATING A THICK Ti64 ALLOY ARTICLE TO HAVE A HIGHER SURFACE YIELD AND TENSILE STRENGTHS AND A LOWER CENTERLINE YIELD AND TENSILE STRENGTHS

APPEAL BRIEF

Mail Stop Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Applicant files its Appeal Brief, together with a Fee Transmittal authorizing the charging of the required fee. A Notice of Appeal and fee were previously filed.

Real party in interest

The real party in interest is General Electric Co.

Related appeals and interferences

Applicant is not aware of any related appeals and/or interferences.

Status of claims

Claims 1-20 were filed. During prosecution, claims 19-20 were cancelled, claims 21-22 were added; and claims 1 and 10 were amended. Claims 2 and 11 were withdrawn from prosecution.

Claims 1, 3-10, 12-18, and 21-22 were finally rejected in the Final Office Action of January 4, 2007. The final rejection of these claims is appealed; a copy of the appealed claims appears in Appendix I.

Status of amendments

A Response to Office Action was filed responsive to the Final Office Action, but it had no claim amendments.

Summary of claimed subject matter

The method of claim 1 is depicted in the block flow diagram of Figure 1, and discussed at para. [0018]-[0026] of the Specification. Examples of components that may be produced by the method are found in Figures 2-3. Claim 1 recites a method for fabricating a forged titanium-alloy article (such as a gas turbine disk 50). The method comprises the steps of providing (step 20) a workpiece made of a titanium alloy having a nominal composition in weight percent of 6 percent aluminum, 4 percent vanadium, 0.2 percent oxygen, balance titanium and impurities. [0018]. The titanium alloy has a beta-transus temperature. [0018]. The workpiece is thereafter forged (step 22) to make a forged gas turbine engine component (50, 60), wherein the forged gas turbine engine component (50, 60) has a thick portion thereof with a section thickness greater than 2-1/4 inches. [0019]. The method includes thereafter heat treating (step 26) the forged gas turbine engine component (50, 60). The heat treating (step 26) is performed by solution heat treating (step 28) the forged gas turbine engine component (50, 60) at a temperature of from about 50°F to about 75°F below the beta-transus temperature, thereafter water quenching (step 30) the gas turbine engine component (50, 60) to room temperature, and thereafter aging (step 32) the gas turbine engine component (50, 60) at a temperature of from about 900°F to about 1000°F. [0022]-[0024]. The method further includes thereafter final machining (step 36) the forged gas turbine engine component (50, 60). [0026].

The method of claim 10 is also depicted in the block flow diagram of Figure 1, and discussed at para. [0018]-[0026] of the Specification. Examples of components that may be

produced by the method are found in Figures 2-3. Claim 10 recites a method for fabricating a forged titanium-alloy article (such as a gas turbine disk 50), wherein a thick portion of the titanium-alloy article (50) has a section thickness of at least 2-1/4 inches. [0019]. The method comprises the steps of providing (step 20) a workpiece made of a titanium alloy having a nominal composition in weight percent of 6 percent aluminum, 4 percent vanadium, 0.2 percent oxygen, balance titanium and impurities, wherein the titanium alloy has a beta-transus temperature [0018], thereafter forging (step 22) the workpiece to make a forged gas turbine engine component (50, 60), and thereafter heat treating (step 26) the forged gas turbine engine component (50, 60). The heat treating (step 26) is performed by solution heat treating (step 28) the forged gas turbine engine component (50, 60) at a temperature of from about 50°F to about 75°F below the beta-transus temperature, thereafter water quenching (step 30) the gas turbine engine component (50, 60) to room temperature, and thereafter aging (step 32) the gas turbine engine component (50, 60) at a temperature of from about 900°F to about 1000°F [0022]-[0024], and thereafter final machining the gas turbine engine component (50, 60), wherein the thick portion has a 0.2 percent yield strength of from about 120 ksi to about 140 ksi at its centerline, and a 0.2 percent yield strength of from about 160 ksi to about 175 ksi at a location about 1/2 inch below a surface thereof. [0027]

Grounds of rejection to be reviewed on appeal

Ground 1. Claims 1, 3-7, 10, 12-16, and 21-22 are rejected under 35 USC 103 over admitted prior art [0002] in view of Beier U.S. Pub. 2001/0048019, Woodfield U.S. Pub. 2004/0089380, the ASM Handbook Volume 4, and the website of Titanium Metals Corporation found at www.timet.com/timetal6-4frame.html.

Ground 2. Claims 8-9 and 17-18 are rejected under 35 USC 103 over admitted prior art in view of Beier U.S. Pub. 2001/0048019, Woodfield U.S. Pub. 2004/0089380, the ASM Handbook, and the website of Titanium Metals Corporation found at www.timet.com/timetal6-4frame.html, and further in view of Bewlay U.S. Patent 6,370,956.

Argument

In discussing the two grounds of rejection, reference will be made to the Final Office Action of January 4, 2007, as well as the previous Nonfinal Office Action of July 20, 2006. The Final Office Action did not restate the explanations of the rejections, but instead

incorporated the explanations from the Nonfinal Office Action, necessitating the reference to the Nonfinal Office Action.

Ground 1. Claims 1, 3-7, 10, 12-16, and 21-22 are rejected under 35 USC 103 over admitted prior art [0002] in view of Beier U.S. Pub. 2001/0048019, Woodfield U.S. Pub. 2004/0089380, the ASM Handbook Volume 4, and the website of Titanium Metals Corporation found at www.timet.com/timetal6-4frame.html.

Inapplicability of "Prior Art" References

Admitted prior art [0002].

The "admitted prior art [0002]" does not legally qualify as prior art and may not be used in constructing the rejection. Only certain types of information qualify as "admitted prior art" under 35 USC 103. Generally, the material in the Specification of the application under examination is not prior art. However, MPEP 2129 I and II provide an exception and define may be used as prior art from the Specification. MPEP 2129 II states:

> "Where the specification identifies work done by another as 'prior art,' the subject matter so identified is treated as admitted prior art."

This position is supported in the MPEP by a reference to In re Nomiya, "holding applicant's labeling of two figures in the application drawings as 'prior art' to be an admission that what was pictured was prior art relative to applicant's improvement."

The present Specification does not label or otherwise identify the material at para. [0002]-[0005] as "prior art." The material at para. [0002]-[0005] is not labeled or otherwise identified as either "work done by another" or "prior art." Accordingly, the material at para. [0002]-[0005] cannot be used as "prior art" under the provisions of MPEP 2129 II.

One of the several problems with the attempted reliance on "admitted" prior art from the Specification that is not identified by the Applicant as "prior art" is that there may be an attempt by the Examiner to alter the alleged admission's scope to suit the rejection. The rejection found in the Nonfinal Office Action of July 20, 2006, seeks to rely on just a portion of the Background of the Specification, not the entire Background. (Nonfinal Office Action, page 4, lines 2-3: "The admission does not include the claimed heat treating steps...") But in fact the Specification does discuss heat treating steps in para. [0003] different from what the Examiner wishes to select to support the rejection. The entire Background at para. [0002]-[0005] gives the full details of, and explains why the approach discussed in, para.

[0002] is not satisfactory. Thus, the entirety of the Background, if it were prior art, teaches away from the present approach. The reliance on only the favorable portion of a reference while ignoring the unfavorable portions is a per se hindsight reconstruction that is not permitted by the case authority and the MPEP.

The material asserted to be "admitted prior art" discusses a heat treatment contrary to that recited in the present claims, compare para. [0003] of the present Specification with the present claims. It is a well-established principle of law that a prima facie case of obviousness may not properly be based on a reference which teaches away from the present invention as recited in the claims.

> "A reference may be said to teach away when a person of ordinary skill, upon reading the reference, would be discouraged from following the path set out in the reference, or would be led in a direction divergent from the path that was taken by the applicant. In re Sponnoble, 160 USPQ 237 244 (CCPA 1969)...As "a useful general rule,"..."a reference that 'teaches away' can not create a prima facie case of obviousness." In re Gurley, 31 USPQ2d 1130, 1132 (Fed. Cir. 1994)."

As plainly stated, the alleged "admitted prior art" cannot be used to create a prima facie case of obviousness.

Accordingly, for all of the reasons discussed above, the "admitted prior art [0002]" is not properly applied as prior art under 35 USC 103 and must be withdrawn.

The Advisory Action of March 15, 2007, cites but does not apply a new reference, Chakrabarti U.S. Patent 5,118,363, for the proposition "that the Ti-6Al-4V-0.2O alloy is present in the prior art." This reference was not applied to reject the claims, and therefore Applicant need not respond fully to this reference. However, Applicant does note that this reference, if it were applied to reject the claims, teaches away from the present invention, the claims of which recite both composition and processing steps. Chakrabarti sets forth processing steps at col. 1, lines 33-38 and col. 2, line 33-col. 3, line 56, and also in claim 1 at col. 6, lines 11-29, that are completely contrary to and at odds with the recitations of the present claims. If this reference had been applied to reject the claims, it would have been readily distinguishable.

"Well known"

The explanation of the rejection relies on "well known" prior art. *See* for example Nonfinal Office Action of July 20, 2006, page 4, line 16. Applicant timely traversed this attempted use of "well known" prior art, to the extent that it is intended to suggest any prior art beyond that which is specifically disclosed and taught in the references. "Well known" is not a class of statutory prior art recognized in 35 USC 102 or 35 USC 103. Applicant requested that, if the rejection was to be maintained, the Examiner clarify whether the "well known" is meant to apply to anything beyond the explicit disclosure and teachings of the applied references and, if so, to apply a statutory prior art reference and set forth a rejection that incorporates the statutory prior art. MPEP 2144.03. If the asserted limitations are in fact well known, it should present no problem to cite and apply an appropriate statutory prior art reference. There was no response, and no prior art reference was applied responsive to this request.

The Sec. 103 rejections

Assuming, *arguendo*, that all references are properly applied, they still do not establish a prima facie §103 ground of rejection.

MPEP 2142, under ESTABLISHING A PRIMA FACIE CASE OF OBVIOUSNESS, provides: "To establish a prima facie case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine the reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. [citations omitted]. *See* MPEP para 2143-2143.03 for decisions pertinent to each of these criteria."

The first of the requirements of MPEP 2142 is that "there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine the reference teachings." The present rejection is a §103 combination rejection. To reach a proper teaching of an article or process through a combination of references, there must be stated an objective motivation to combine the teachings of the references, not a hindsight rationalization in light of the disclosure of the specification being examined. MPEP 2142,

2143 and 2143.01. *See also*, for example, In re Fine, 5 USPQ2d 1596, 1598 (at headnote 1) (Fed.Cir. 1988), In re Laskowski, 10 USPQ2d 1397, 1398 (Fed.Cir. 1989), W.L. Gore & Associates v. Garlock, Inc., 220 USPQ 303, 311-313 (Fed. Cir., 1983), and Ex parte Levengood, 28 USPQ2d 1300 (Board of Appeals and Interferences, 1993); Ex parte Chicago Rawhide Manufacturing Co., 223 USPQ 351 (Board of Appeals 1984). As stated in In re Fine at 5 USPQ2d 1598:

> "The PTO has the burden under §103 to establish a prima facie case of obviousness. [citation omitted] It can satisfy this burden only by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references."

And, at 5 USPQ2d 1600:

> "One cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention."

Following this authority, the MPEP states that the examiner must provide such an objective basis for combining the teachings of the applied prior art. In constructing such rejections, MPEP 2143.01 provides specific instructions as to what must be shown in order to extract specific teachings from the individual references:

> "Obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention when there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. In re Fine, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988); In re Jones, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992)."
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> * * * * *
>
> "The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination." In re Mills, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990)."
>
> * * * * *

> "A statement that modifications of the prior art to meet the claimed invention would have been 'well within the ordinary skill of the art at the time the claimed invention was made' because the references relied upon teach that all aspects of the claimed invention were individually known in the art is not sufficient to establish a prima facie case of obviousness without some objective reason to combine the teachings of the references. Ex parte Levengood, 28 USPQ2d 1300 (Bd. Pat. App. & Inter. 1993)."

Here, there is set forth no objective basis for combining the teachings of the references in the manner used by this rejection, and selecting the helpful portions from each reference while ignoring the unhelpful portions. An objective basis is one set forth in the art or which can be established by a declaration, not one that can be developed in light of the present disclosure.

In this case, there is an attempt to combine five different references having different and inconsistent teachings. The combination of the teachings of five references to demonstrate obviousness is not barred per se, but there are barriers to picking and choosing only the helpful portions of the each reference, while ignoring or discounting the unhelpful portions.

In the section cited by the Examiner as the "admitted prior art," when taken in its entirety, recites that "[I]n the current best practice to achieve the optimal combination of strength and other properties, after forging the thick-section Ti64 articles are typically heat treated at a temperature of 1750°F, followed by an anneal heat treatment at 1300°F." The Timet reference specifies a different heat treatment. Woodfield specifies yet a different heat treatment at para. [0033]. ASM teaches yet a different heat treatment. There is no basis in the references themselves for resolving the differences in these heat treatments. Specifically, none of the references indicate that any one of the approaches is to be selected over the others. If the position of the explanation of the rejection is that one particular heat treatment may be picked in preference to the others, then some objective basis for that selection in the prior art itself must be set forth. The present explanation is based on "the motivation being implicit in the knowledge of one of ordinary skill in the art as evidenced by the ASM Handbook." The ASM Handbook reference is seven densely packed pages of information, and Applicant can find nothing in those pages that would support the substitution of one heat treatment for another heat treatment as specified in the "admitted prior art (0002)."

Applicant asked the Examiner to be more specific as to what teaching of ASM Handbook is relied upon for combining the teachings of the references, but there was no

response. Beier is applied for a teaching of quenching at para. [0010], but this discussion relates to the heat treatment of 6000-series aluminum alloys discussed at para. [0008]-[0009]. The disclosure of Beier has nothing to do with titanium alloys and more specifically nothing to do with Ti64 alloys and even more specifically has nothing to do with the recited alloys of the present claims. This is pure pick-and-choose hindsight reconstruction of a recited approach.

Thus, as it stands now, there has been advanced no objective basis for combining the teachings of the references.

The second of the requirements of MPEP 2142 is an expectation of success. This requirement has not been addressed in the explanation of the rejection, and in any event more than Examiner's argument is required here.

As stated in MPEP 2142, "The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. [citations omitted]."

The third of the requirements is that "the prior art reference (or references when combined) must teach or suggest all the claim limitations." In this regard, the following principle of law applies to all §103 rejections. MPEP 2143.03 provides "To establish prima facie obviousness of a claimed invention, all claim limitations must be taught or suggested by the prior art. In re Royka, 490 F2d 981, 180 USPQ 580 (CCPA 1974). All words in a claim must be considered in judging the patentability of that claim against the prior art. In re Wilson, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970)." [emphasis added] That is, to have any expectation of rejecting the claims over a single reference or a combination of references, each limitation must be taught somewhere in the applied prior art. If limitations are not found in any of the applied prior art, the rejection cannot stand. In this case, the applied prior art references clearly do not arguably teach some limitations of the claims in the present context.

Applicant addresses the limitations of the rejected claims and the absence of a teaching in the "prior art."

Claim 1

Claim 1 recites in part:

> "providing a workpiece made of a titanium alloy having a nominal composition in weight percent of 6 percent aluminum, 4 percent vanadium,

0.2 percent oxygen, balance titanium and impurities, wherein the titanium alloy has a beta-transus temperature; thereafter

forging the workpiece to make a forged gas turbine engine component, wherein the forged gas turbine engine component has a thick portion thereof with a section thickness greater than 2-1/4 inches; thereafter

heating treating the forged gas turbine engine component by

solution heat treating the forged gas turbine engine component at a temperature of from about 50°F to about 75°F below the beta-transus temperature, thereafter

water quenching the gas turbine engine component to room temperature, and thereafter

aging the gas turbine engine component at a temperature of from about 900°F to about 1000°F; and thereafter

final machining the forged gas turbine engine component."

None of the references, alone or in combination of steps. "Admitted prior art" teaches a completely different heat treatment at para. [0003]. No reason has been presented to select only a limited portion of the asserted reference and ignore its teaching of the heat treatment. Woodfield teaches a different heat treatment, and Beier teaches processing for aluminum alloys, not titanium alloys and specifically not Ti64 and more specifically not the recited oxygen-modified Ti64 alloy.

The Titanium Metals Corporation (Timet) download does not deal with forged articles. Forging is a process in which the metal is extensively deformed under compression loading to impart specific properties to the metal. The structure of the metal is highly altered by the forging operation. The heat treatments that may be used with non-forged articles are not applicable to forged articles, absent some factual showing of applicability. The thermal processing of deformed articles is termed "thermomechanical processing," as distinct from the "heat treating" of references such as in the Timet download.

In the last sentence on page 7 of the Final Office Action, the Examiner requests "Evidence of the criticality of this particular titanium alloy with this process..." A showing of criticality is not required because no prima facie showing that the references teach the claimed limitations has been made. There is no such showing as of this time. When such a prima facie showing is made, Applicant will take whatever further actions are required.

The majority of the Specification addresses the critical nature of this problem of heat treating thick forgings, yet not one of the references remotely suggests the presently claimed processing for such thick-section forgings.

Applicant has addressed the distinction of the present approach from the teachings of some of the prior art references applied here. As stated in the Specification,

> **"[0029]** It has been known in the art to heat treat thin pieces of Ti64 material, less than about 2 inches thick, by solution heat treating at a temperature of from about 50°F to about 75°F below the beta-transus temperature, thereafter water quenching to a temperature of less than about 850°F, and thereafter aging at a temperature of from about 900°F to about 1000°F. However, the benefits could not be extended to thicknesses greater than about 2 inches. In the present approach, it is recognized that a harder zone near the surface of the article and a softer zone in the center of the article is beneficial to the resulting properties. This approach permits the Ti64 alloy to be used to higher performance levels, and avoids the need to utilize more-expensive alloys to make thick-section articles."

Claim 3

Claim 3 incorporates the limitations of parent claim 1, which are not taught by the combination of references for the reasons stated. Claim 3 is therefore also not taught by the combination of references.

Claim 3 further recites in part:

> "forging the workpiece to make the forged gas turbine engine component selected from the group consisting of a compressor disk, a fan disk, and a gas turbine engine mount."

None of the properly applied prior art references teach this limitation.

Claim 4

Claim 4 incorporates the limitations of parent claim 1, which are not taught by the combination of references for the reasons stated. Claim 4 is therefore also not taught by the combination of references.

Claim 4 further recites in part:

"forging the workpiece to make a forged compressor disk or a forged fan disk."

None of the properly applied prior art references teach this limitation.

Claim 5

Claim 5 incorporates the limitations of parent claim 1, which are not taught by the combination of references for the reasons stated. Claim 5 is therefore also not taught by the combination of references.

Claim 5 further recites in part:

"solution heat treating the forged gas turbine engine component for a time of from about 45 minutes to about 75 minutes." [emphasis added]

The explanation of the rejection (paragraph bridging pages 5-6 of the Nonfinal Office Action) argues that this limitation is taught by Table 5 of ASM Handbook. It is not, for at least two reasons. The materials disclosed in Table 5 of ASM Handbook are not "forged" (note the title of the section of ASM Handbook, "Heat Treating...", not Thermomechanical processing), and they are of different compositions than those of the present claims.

Claim 6

Claim 6 incorporates the limitations of parent claim 1, which are not taught by the combination of references for the reasons stated. Claim 6 is therefore also not taught by the combination of references.

Claim 6 further recites in part:

"the step of water quenching is initiated within about 20 seconds of completing the step of solution heat treating."

None of the references teach a time for the initiation of quenching of a forged article.

Claim 7

Claim 7 incorporates the limitations of parent claim 1, which are not taught by the combination of references for the reasons stated. Claim 7 is therefore also not taught by the combination of references.

Claim 7 further recites in part:

"aging the forged gas turbine engine component for a time of from at least about 4 hours" [emphasis added]

None of the references specify an aging time of a forged gas turbine engine component.

Claim 10

Applicant incorporates the same points made above in respect to claim 1 as to the rejection of claim 10.

Additionally, claim 10 recites in part: "the thick portion has a 0.2 percent yield strength of from about 120 ksi to about 140 ksi at its centerline, and a 0.2 percent yield strength of from about 160 ksi to about 175 ksi at a location about 1/2 inch below a surface thereof." The explanation of the rejection (page 6, lines 10-14 of the Nonfinal Office Action) asserts that these properties are somehow "inherent" in the collection of five references.

MPEP 2112-2113 sets forth the law on inherency. Inherency is not properly asserted unless there is evidence to suggest that the asserted property or characteristic is necessarily present in the teachings of the prior art reference. No inherency basis is set forth for collections of teachings of unrelated references as is the case here. "Inherency" is used when every aspect of the disclosure of a reference and the claimed subject matter are otherwise the same, then it may be inferred that some property or characteristic further recited in the claim must necessarily be present in the art reference. MPEP 2112 provides "The fact that a certain result or characteristic may occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic. In re Rijckaert, 9 F.3d 1531, 1534, 28 USPQ2d 1955, 1957 (Fed. Cir. 1993); In re Oelrich, 666 F.2d 578, 581-82, 212 USPQ 323, 326 (CCPA 1981). "To establish inherency, the extrinsic evidence 'must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. Inherency, however, may not be established by probabilities or possibilities. The mere fact that a

certain thing may result from a given set of circumstances is not sufficient.'" In re Robertson, 169 F.3d 743, 745, 49 USPQ2d 1949, 1950-51 (Fed. Cir. 1999) (citations omitted).

Further, nothing in the MPEP suggests that the principle of "inherency" may be applied to this assemblage of teachings from five unrelated references, where it is clear that such a "thing described in the reference" has never been previously described or physically existed.

Claim 12

Claim 12 incorporates the limitations of parent claim 10, which are not taught by the combination of references for the reasons stated. Claim 12 is therefore also not taught by the combination of references.

Claim 12 further recites in part:

> "forging the workpiece to make the forged gas turbine engine component selected from the group consisting of a compressor disk, a fan disk, and a gas turbine engine mount."

None of the properly applied prior art references teach this limitation.

Claim 13

Claim 13 incorporates the limitations of parent claim 10, which are not taught by the combination of references for the reasons stated. Claim 13 is therefore also not taught by the combination of references.

Claim 13 further recites in part:

> "forging the workpiece to make a forged compressor disk or a forged fan disk."

None of the properly applied prior art references teach this limitation.

Claim 14

Claim 14 incorporates the limitations of parent claim 19, which are not taught by the combination of references for the reasons stated. Claim 14 is therefore also not taught by the combination of references.

Claim 14 further recites in part:

"solution heat treating the forged gas turbine engine component for a time of from about 45 minutes to about 75 minutes." [emphasis added]

The explanation of the rejection (paragraph bridging pages 5-6 of the Nonfinal Office Action) argues that this limitation is taught by Table 5 of ASM Handbook. It is not, for at least two reasons. The materials disclosed in Table 5 of ASM Handbook are not "forged" (note the title of the section of ASM Handbook, "Heat Treating...", not Thermomechanical processing), and they are of different compositions than those of the present claims.

Claim 15

Claim 15 incorporates the limitations of parent claim 10, which are not taught by the combination of references for the reasons stated. Claim 15 is therefore also not taught by the combination of references.

Claim 15 further recites in part:

"the step of water quenching is initiated within about 20 seconds of completing the step of solution heat treating."

None of the references teach a time for the initiation of quenching of a forged article.

Claim 16

Claim 16 incorporates the limitations of parent claim 10, which are not taught by the combination of references for the reasons stated. Claim 16 is therefore also not taught by the combination of references.

Claim 16 further recites in part:

"aging the forged gas turbine engine component for a time of from at least about 4 hours" [emphasis added].

None of the references specify an aging time of a forged gas turbine engine component.

Claim 21

Claim 21 incorporates the limitations of parent claim 1, which are not taught by the combination of references for the reasons stated. Claim 21 is therefore also not taught by the combination of references.

Claim 21 further recites in part:

> "removing the alpha-case at a surface of the gas turbine engine component."

None of the references specifically teach this limitation.

Claim 22

Claim 22 incorporates the limitations of parent claim 10, which are not taught by the combination of references for the reasons stated. Claim 22 is therefore also not taught by the combination of references.

Claim 22 further recites in part:

> "removing the alpha-case at a surface of the gas turbine engine component."

None of the references specifically teach this limitation.

Ground 2. Claims 8-9 and 17-18 are rejected under 35 USC 103 over admitted prior art in view of Beier U.S. Pub. 2001/0048019, Woodfield U.S. Pub. 2004/0089380, the ASM Handbook, and the website of Titanium Metals Corporation found at www.timet.com/timetal6-4frame.html, and further in view of Bewlay U.S. Patent 6,370,956.

Applicant incorporates the prior discussion related to the Ground 1 rejection.

This rejection is the product of combining six different, unrelated references in an attempt to make inventions "obvious," with no basis for combining their disparate teachings.

Applicant incorporates from the prior remarks concerning the Ground 1 rejection the discussion of the requirement of an objective basis for combining the teachings of the references, and the requirement for an objective showing of an expectation of success. Bewlay adds nothing in regard to fulfilling these requirements.

Claim 8

Claim 8 incorporates the limitations of parent claim 1, which are not taught by the combination of references for the reasons stated. Bewlay adds nothing in this regard. Claim 8 is therefore also not taught by the combination of references.

Claim 8 further recites in part:

> "an additional step, after the step of forging the workpiece and before the step of heat treating, of
>
> ultrasonically inspecting the forged gas turbine engine component."

The "forged gas turbine engine component" is recited in parent claim 1 to have "a thick portion thereof with a section thickness greater than 2-1/4 inches." Bewlay has no such teaching, and in fact is used only with much thinner articles than recited, see for example col. 6, line 10, where the article has a thickness of 2.80 cm, or about 1.1 inches.

Additionally, the pieces that are ultrasonically inspected in Bewlay are not further heat treated, and accordingly the recited limitation cannot be taught because it is not "before the step of heat treating."

Claim 9

Claim 9 incorporates the limitations of parent claim 1, which are not taught by the combination of references for the reasons stated. Bewlay adds nothing in this regard. Claim 9 is therefore also not taught by the combination of references.

Claim 9 further recites in part:

> "an additional step, after the step of forging the workpiece and before the step of final machining, of
>
> ultrasonically inspecting the forged gas turbine engine component."

The "forged gas turbine engine component" is recited in parent claim 1 to have "a thick portion thereof with a section thickness greater than 2-1/4 inches." Bewlay has no such teaching, and in fact is used only with much thinner articles than recited, *see for example* col. 6, line 10, where the article has a thickness of 2.80 cm, or about 1.1 inches.

Additionally, the pieces that are ultrasonically inspected in Bewlay are not further final machined, and accordingly the recited limitation cannot be taught because it is not "before the step of final machining."

Claim 17

Claim 17 incorporates the limitations of parent claim 10, which are not taught by the combination of references for the reasons stated. Bewlay adds nothing in this regard. Claim 17 is therefore also not taught by the combination of references.

Claim 17 further recites in part:

> "an additional step, after the step of forging the workpiece and before the step of heat treating, of
>
> ultrasonically inspecting the forged gas turbine engine component."

The "forged gas turbine engine component" is recited in parent claim 1 to have "a thick portion thereof with a section thickness greater than 2-1/4 inches." Bewlay has no such teaching, and in fact is used only with much thinner articles than recited, *see for example* col. 6, line 10, where the article has a thickness of 2.80 cm, or about 1.1 inches.

Additionally, the pieces that are ultrasonically inspected in Bewlay are not further heat treated, and accordingly the recited limitation cannot be taught because it is not "before the step of heat treating."

Claim 18

Claim 18 incorporates the limitations of parent claim 10, which are not taught by the combination of references for the reasons stated. Bewlay adds nothing in this regard. Claim 18 is therefore also not taught by the combination of references.

Claim 18 further recites in part:

> "an additional step, after the step of forging the workpiece and before the step of final machining, of

ultrasonically inspecting the forged gas turbine engine component."

The "forged gas turbine engine component" is recited in parent claim 1 to have "a thick portion thereof with a section thickness greater than 2-1/4 inches." Bewlay has no such teaching, and in fact is used only with much thinner articles than recited, *see for example* col. 6, line 10, where the article has a thickness of 2.80 cm, or about 1.1 inches.

Additionally, the pieces that are ultrasonically inspected in Bewlay are not further final machined, and accordingly the recited limitation cannot be taught because it is not "before the step of final machining."

Bewlay teaches, at col. 5, lines 60-67, ultrasonic inspecting a material that is made of a completely different alloy type. As stated in Table 5 of ASM, Ti6242 is an alpha or near-alpha titanium alloy, and Ti64 is an alpha-beta titanium alloy. Further, there is no indication in Bewlay that the ultrasonic inspection taught at col. 5, lines 60-67 is performed "after the step of forging the workpiece and before the step of heat treating" as recited. Applicant has studied the portion of Bewlay following col. 5, lines 60-67 and cannot find that the specimens selected for ultrasonic inspection as described at col. 5, lines 60-67 were ever subsequently heat treated, and specifically not heat treated in any manner as recited in the respective parent claims.

SUMMARY AND CONCLUSION

The two grounds of rejection combine, respectively, five and six references to make inventions "obvious" and each case rely on references that are not properly applied. Even if they are applied, the combination of references still does not teach the claim limitations.

Applicant asks that the Board reverse the rejections.

For all of the foregoing reasons, Applicant asks that the Board reverse the rejections. The Commissioner is authorized to charge any additional fees that may be due or credit any overpayments to the undersigned's Account Number 50-1059.

Respectfully submitted,

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APPENDIX I

Copy of Claims Involved in the Appeal

1. A method for fabricating a forged titanium-alloy article, comprising the steps of

providing a workpiece made of a titanium alloy having a nominal composition in weight percent of 6 percent aluminum, 4 percent vanadium, 0.2 percent oxygen, balance titanium and impurities, wherein the titanium alloy has a beta-transus temperature; thereafter

forging the workpiece to make a forged gas turbine engine component, wherein the forged gas turbine engine component has a thick portion thereof with a section thickness greater than 2-1/4 inches; thereafter

heat treating the forged gas turbine engine component by

solution heat treating the forged gas turbine engine component at a temperature of from about 50°F to about 75°F below the beta-transus temperature, thereafter

water quenching the gas turbine engine component to room temperature, and thereafter

aging the gas turbine engine component at a temperature of from about 900°F to about 1000°F; and thereafter

final machining the forged gas turbine engine component.

3. The method of claim 1, wherein the step of forging the workpiece includes the step of

forging the workpiece to make the forged gas turbine engine component selected from the group consisting of a compressor disk, a fan disk, and a gas turbine engine mount.

4. The method of claim 1, wherein the step of forging the workpiece includes the step of

forging the workpiece to make a forged compressor disk or a forged fan disk.

5. The method of claim 1, wherein the step of solution heat treating includes the step of

solution heat treating the forged gas turbine engine component for a time of from about 45 minutes to about 75 minutes.

6. The method of claim 1, wherein the step of water quenching is initiated within about 20 seconds of completing the step of solution heat treating.

7. The method of claim 1, wherein the step of aging includes the step of

aging the forged gas turbine engine component for a time of from at least about 4 hours.

8. The method of claim 1, including an additional step, after the step of forging the workpiece and before the step of heat treating, of

ultrasonically inspecting the forged gas turbine engine component.

9. The method of claim 1, including an additional step, after the step of forging the workpiece and before the step of final machining, of

ultrasonically inspecting the forged gas turbine engine component.

10. A method for fabricating a forged titanium-alloy article, wherein a thick portion of the titanium-alloy article has a section thickness of at least 2-1/4 inches, comprising the steps of

providing a workpiece made of a titanium alloy having a nominal composition in weight percent of 6 percent aluminum, 4 percent vanadium, 0.2 percent oxygen, balance titanium and impurities, wherein the titanium alloy has a beta-transus temperature; thereafter

forging the workpiece to make a forged gas turbine engine component; thereafter

heat treating the forged gas turbine engine component by

solution heat treating the forged gas turbine engine component at a temperature of from about 50°F to about 75°F below the beta-transus temperature, thereafter

water quenching the gas turbine engine component to room temperature, and thereafter

aging the gas turbine engine component at a temperature of from about 900°F to about 1000°F; and thereafter

final machining the gas turbine engine component, wherein the thick portion has a 0.2 percent yield strength of from about 120 ksi to about 140 ksi at its centerline, and a 0.2 percent yield strength of from about 160 ksi to about 175 ksi at a location about 1/2 inch below a surface thereof.

12. The method of claim 10, wherein the step of forging the workpiece includes the step of

forging the workpiece to make the forged gas turbine engine component selected from the group consisting of a compressor disk, a fan disk, and a gas turbine engine mount.

13. The method of claim 10, wherein the step of forging the workpiece includes the step of

forging the workpiece to make a forged compressor disk or a forged fan disk.

14. The method of claim 10, wherein the step of solution heat treating includes the step of

solution heat treating the forged gas turbine engine component for a time of from about 45 minutes to about 75 minutes.

15. The method of claim 10, wherein the step of water quenching is initiated within about 20 seconds of completing the step of solution heat treating.

16. The method of claim 10, wherein the step of aging includes the step of

aging the forged gas turbine engine component for a time of at least about 4 hours.

17. The method of claim 10, including an additional step, after the step of forging the workpiece and before the step of heat treating, of

ultrasonically inspecting the forged gas turbine engine component.

18. The method of claim 10, including an additional step, after the step of heat treating and before the step of final machining, of

ultrasonically inspecting the forged gas turbine engine component.

21. The method of claim 1, wherein the step of final machining includes the step of

removing the alpha-case at a surface of the gas turbine engine component.

22. The method of claim 10, wherein the step of final machining includes the step of

removing the alpha-case at the surface of the gas turbine engine component..

APPENDIX II

Evidence Entered and Relied Upon in the Appeal

None.

APPENDIX III

Related Proceedings

None.